

THALLIUM (ATOMIC ABSORPTION, FURNACE TECHNIQUE)

1.0 SCOPE AND APPLICATION

1.1 See Section 1.0 of Method 7000.

2.0 SUMMARY OF METHOD

2.1 See Section 2.0 of Method 7000.

3.0 INTERFERENCES

3.1 See Section 3.0 of Method 7000 if interferences are suspected.

3.2 Background correction is required.

3.3 Hydrochloric acid or excessive chloride will cause volatilization of thallium at low temperatures. Verification that losses are not occurring, by spiked samples or standard additions, must be made for each sample matrix.

3.4 Palladium is a suitable matrix modifier for thallium analysis.

4.0 APPARATUS AND MATERIALS

4.1 For basic apparatus, see Section 4.0 of Method 7000.

4.2 Instrument parameters (general):

4.2.1 **Drying time and temp:** 30 sec at 125°C.

4.2.2 **Ashing time and temp:** 30 sec at 400°C.

4.2.3 **Atomizing time and temp:** 10 sec at 2400°C.

4.2.4 **Purge gas:** Argon or nitrogen.

4.2.5 **Wavelength:** 276.8 nm.

4.2.6 **Background correction:** Required.

4.2.7 Other operating parameters should be set as specified by the particular instrument manufacturer.

NOTE: The above concentration values and instrument conditions are for a Perkin-Elmer HGA-2100, based on the use of a 20- μ L injection, continuous-flow purge gas, and nonpyrolytic graphite. Smaller sizes of furnace devices or those employing faster rates of atomization can be operated using lower atomization temperatures for shorter time periods than the above-recommended settings.

5.0 REAGENTS

5.1 See Section 5.0 of Method 7000.

5.2 Preparation of standards:

5.2.1 **Stock solution:** Dissolve 1.303 g thallium nitrate, TlNO_3 (analytical reagent grade), in Type II water, acidify with 10 mL concentrated HNO_3 , and dilute to 1 liter with Type II water. Alternatively, procure a certified standard from a supplier and verify by comparison with a second standard.

5.2.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared using the same type of acid and at the same concentrations as in the sample after processing (0.5% v/v HNO_3).

5.3 Palladium chloride: Weigh 0.25 g of PdCl_2 to the nearest 0.0001 g. Dissolve in 10 mL of 1:1 HNO_3 and dilute to 1 liter with Type II water. Use equal volumes of sample and palladium solution.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See Chapter Three, Section 3.1.3, Sample Handling and Preservation.

7.0 PROCEDURE

7.1 Sample preparation: The procedures for preparation of the sample are given in Chapter Three, Section 3.2.

7.2 See Method 7000, Paragraph 7.3, Furnace Procedure. The calculation is given in Method 7000, Paragraph 7.4.

8.0 QUALITY CONTROL

8.1 See Section 8.0 of Method 7000.

9.0 METHOD PERFORMANCE

9.1 Precision and accuracy data are not available at this time.

9.2 The performance characteristics for an aqueous sample free of interferences are:

Optimum concentration range: 5-100 ug/L.

Detection limit: 1 ug/L.

10.0 REFERENCES

1. Application of Matrix-Modification in Determination of Thallium in Wastewater by Graphite-Furnace Atomic-Absorption Spectrometry, Talanta, 31(2) (1984), pp. 150-152.

METHOD 7841
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